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A NEW SPECIES OF *APOCHTHONIUS* CHAMBERLIN FROM OREGON (PSEUDOSCORPIONIDA, CHTHONIIDAE)

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ABSTRACT

A subterranean pseudoscorpion species, *Apochthonius forbesi*, new species, is described from a lavatube sink in central Oregon; it is compared, both morphologically and ecologically, to *A. malheuri* Benedict and Malcolm from Malheur Cave, southeastern Oregon.

INTRODUCTION

Although my recent biogeographical study of Oregon pseudoscorpions has revealed that specimens of the genus *Apochthonius* Chamberlin are the most commonly collected leaf litter inhabiting forms in western Oregon (Benedict 1978), only a very few records of the genus have been reported previously for the state. Chamberlin (1929) described *A. occidentalis* Chamberlin from one male collected from moss at Portland (Multnomah County). Benedict and Malcolm (1973) described *A. malheuri* Benedict and Malcolm from nine specimens recovered from well-rotted wood chips in Malheur Cave (Harney County), and reported *A. minimus* Schuster from one specimen taken in litter of western red cedar (*Thuja plicata* Donn), from east of Steamboat (Douglas County). Muchmore and Benedict (1976:68) in a redescription of the type species of the genus, *Apochthonius moestus* (Banks), also mentioned a "moestus-like" female from litter of mountain spray (*Holodiscus dumosus* (Hook.) Heller), on Steens Mountain (Harney County). The present paper provides a description of a new species which inhabits the mossy-litter layer beneath mountain spray growing in the bottom of the sink in which Charcoal Cave No. 1 of the Arnold Lavatube System (Deschutes County) is located (Greeley 1971).

Apochthonius forbesi, new species

Type record.—Oregon: Deschutes Co., 14 km S, 11 km E of Bend (1385 m), mosses and leaf litter of mountain spray, 20 May 1972 (E. M. Benedict), 1 male (holotype AMNH), 1 female (allotype AMNH).

Etymology.—The specific name is a patronym in honor of Dr. Richard B. Forbes, Professor of Biology, Portland State University, who has greatly encouraged my research of Oregon pseudoscorpions.

Distribution.—Reported only from a single locality in central Oregon.

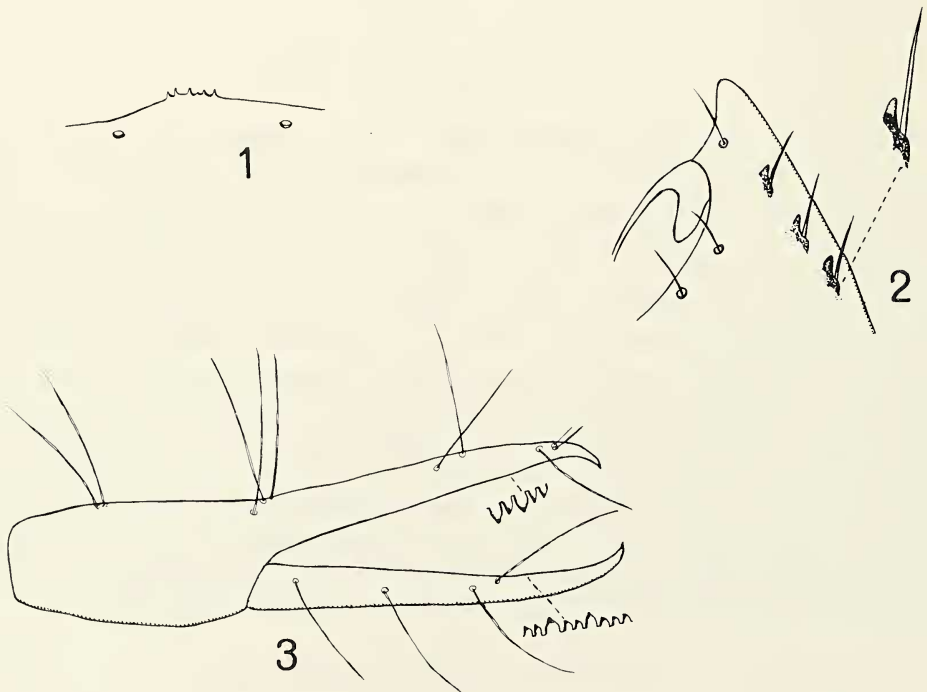
Diagnosis.—With the general features of the genus (see Muchmore and Benedict 1976). A moderately sized species with four very weakly developed eyes and with moderately attenuate appendages; generally similar to *A. malheuri* Benedict and Malcolm (1973), but smaller, slightly stouter and with slightly better eye development.

Description.—Measurements and morphometric ratios in Tables 1 and 2. All sclerotized parts light tan. Derm mostly reticulate throughout.

MALE. Cephalothorax: carapace longer than broad, markedly narrowed posteriorly; anterior margin with small denticulate epistome (Fig. 1) and a few fine denticles laterally; two pairs indistinct eyes, anterior pair located two ocular diameters from anterior carapacial margin, surface of carapace smooth dorsally, becoming somewhat reticulate laterally and posteriorly; chaetotaxy 10-4-4-2-2-4=26, setae shorter than width of palpal femur. Coxal chaetotaxy 2-2-1:0-2-1-CS:2-2:2 or 1-3:2-3; coxa I with elongate, non-setose apical process, and three acute, seta-like coxal spines each with a well-developed, elongate anterior process (Fig. 2); no intercoxal tubercle.

Abdomen: chaetotaxy of holotypic terga 4:4:7:6:9:9:9:9:9:7:6:0; of holotypic sterna 11:(4-4):(2)6-6/5-5(2):(4)8(4):12:12:13:12:14:9:0:mm.

Chelicera: approximately 0.9 as long as carapace; hand with seven setae; fixed finger with approximately 15 marginal teeth, and movable finger with about 12; spinneret a



Figs. 1-3.—*Apochthonius forbesi*, new species, from central Oregon: 1, epistomal area; 2, coxal spine series from coxa I; 3, external aspect of chela.

Table 1.—Measurements and morphometric ratios of *Apochthonius forbesi*, new species from central Oregon. (Abbreviations: B=breadth, D=depth, L=length, ?=indeterminable).

	Measurements (in mm)		Ratios	
	Male	Female	Male	Female
Body L	1.42	1.60		
Abdominal B	?	0.57		
Carapace L	0.46	0.50		
Ocular B	0.39	0.45		
Posterior B	0.33±	0.37		
Chelicera L	0.42±	0.41		
Pedipalp				
Femur L/B	0.55/0.11	0.60/0.12	4.8	4.9
Tibia L/B	0.26/0.14	0.30/0.16	1.9	1.9
Chela L/D	0.85/0.16	0.79/0.17	5.4	4.9
Movable finger L	0.59	0.55		
Hand L	0.27	0.31		
Leg I				
Basifemur L/D	0.30/ ?	0.31/0.07	?	4.6
Telifemur L/D	0.15/ ?	0.18/0.07	?	2.6
Tibia L/D	0.18/ ?	0.21/0.05	?	4.1
Miotarsus L/D	0.38/ ?	0.34/0.04	?	7.8
Leg IV				
Entire femur L/D	0.48/0.18	0.46/ ?	2.7	?
Tibia L/D	0.34/0.08	?	4.4	?
Metatarsus L/D	0.16/0.06	?	2.8	?
Telotarsus L/D	0.30/0.04	0.33/ ?	7.6	?

weakly-developed sclerotic knob; serrula exterior with 20 blades; serrula interior with approximately 12 blades; flagellum of eight long pinnate setae and one short (1/6 length of others) simple seta.

Palp: relatively large and slender. Chelal chaetotaxy and dentition as illustrated (Fig. 3); both fingers with occasional longer, wider teeth interspersed between majority of teeth; fixed finger with approximately 76 teeth, tall quadrangular distally, gradually becoming triangular medially, and basally, merging into acute serrations; movable finger with approximately 68 teeth, distally tall quadrangular, gradually more rounded and lower near finger base. Movable finger with rounded sensillum on external surface, half-way between ST and SB.

Legs: slender. Tactile setae on tibia and both tarsi of leg IV.

FEMALE. Essentially similar to male but more robust. Chaetotaxy of allotypic terga 4:4:8:9:10:10:9:9:9:7:7:0; of sterna 8:(2?)8(3):(3)7(3):12:14:13:15:12:10:0:mm. Fixed finger of chela with 72 teeth, movable finger with 63 teeth.

Nymphal stages are unknown.

Remarks.—In contrast to the other Oregon leaf litter-inhabiting species, *A. forbesi* exhibits somewhat less pigment and/or a thinner cuticle (or both), weaker eyes, slightly slimmer appendages and greater size (Tables 1, 2). "In most epigean forms. . . the femur/carapace ratio is less than 1.1 and the chela/carapace ratio is less than 1.7, while in most of the troglotic forms the corresponding ratios are greater than 1.15 and 1.75 respectively" (Muchmore 1976:78). The femur/carapace ratio of the holotype (male) of *A. forbesi* is 1.19, while the chela/carapace ratio is 1.86, both suggesting some degree of

Table 2.—Comparison of selected morphometric ratios of the palps and carapace of males of species of *Apochthonius* Chamberlin according to ecological types. (Abbreviations: L=length, W=depth or breadth).

	<u>Epigean spp.</u>	<u>Cave spp.</u>	<u><i>A. forbesi</i></u>	<u><i>A. malheuri</i></u>
Femur L/W	4.7 mean	5.2 mean	4.8	5.6 mean
Chela L/W	5.0 mean	5.8 mean	5.4	5.7 mean
Femur L/carapace L	<1.1	>1.15	1.19	1.32
Chela L/carapace L	<1.7	>1.75	1.86	1.92

attenuation of the palp. Even though the total specialization of *A. forbesi* for subterranean existence is not as marked as that observed for many cavernicolous species such as *A. malheuri* (Table 2), it is still apparent. For further discussions of the troglobitic tendencies exhibited by species of *Apochthonius*, see Chamberlin and Malcolm (1960), Benedict and Malcolm (1973) and Muchmore (1976).

Ecology.—It is especially noteworthy that *A. malheuri* and *A. forbesi* exhibit some degree of morphological specializations, as both appear to represent separate relict populations occurring in mesic habitats of otherwise semi-arid areas east of the Cascade Mountains of Oregon. Malheur Cave, characterized recently by Palmer (1975) and Benedict et al. (1977) as a moderately warm thermal cave, is located in a grassland-sagebrush (*Artemisia tridentata* Nutt.) area at an elevation of 1220 m where the average annual precipitation is 290 mm. Charcoal Sink, approximately 220 km W of Malheur Cave, is in an area ecotonal between open stands of ponderosa pine (*Pinus ponderosa* (Dougl. ex. Loud.)) and communities of grasses and sagebrush where the average annual precipitation is approximately 320 mm. This steep-sided sink is about 13 m deep and 32 m wide by 170 m long (Greeley 1971) and serves as a cold air trap. Thus, the microclimate on the floor of the sink differs markedly from that of the surface. In fact permanent ice is found in Charcoal Cave at the northwestern end of the sink, and the mossy-litter layer inhabited by *A. forbesi* is frozen during most of the winter. Species differ on the two levels. For example, *A. forbesi* and *Syarinus* sp. live in the semi-mesic litter of the sink, while *Dactylochelifera silvestris* Hoff and *Haplochelifera philipi* (Chamberlin) inhabit the semi-xeric litter beneath the ponderosa pine and green manzanita (*Arctostaphylos patula* Greene) of the surface.

Material examined.—Only the types.

ACKNOWLEDGMENTS

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